Remarks

Applicants claimed invention has been carefully reviewed in light of the Office Action in which a new ground of rejection is presented. In particular, claims 1-5, 7, 9, 12, 13, 15-18, 20-26, 28 and 31-38 were rejected under 35 U.S.C. 103(a) as being unpatentable over Uz (U.S. Patent No. 5,682,204) in view of Flannaghan (U.S. Patent No. 4,703,358). This rejection is respectfully traversed, and reconsideration thereof is requested. Claims 1-10, & 12-38 remain pending.

Initially, applicants gratefully acknowledge the indication of allowability of claims 6, 8, 10, 14, 19, 27, 29 and 30 if rewritten in independent form including all the limitations of the base claim and any intervening claims. In response, claims 6, 8, 10, 14, 19, 27 & 29 are rewritten herein in independent form. (Claim 30 depends from claim 29.) Thus, these claims are believed to be in condition for allowance.

By this paper, independent claims 1, 17, 24, 31, 37 & 38 have been amended to more distinctly claim certain aspects of applicants' invention. Specifically, applicants disclose a process for determining whether a given frame includes a noisy portion. This process uses intraframe statistics to determine without reference to another frame whether the frame includes a noisy portion. Support for the amendment can be found through out the application. For

example, reference the discussion at page 15, line 6 - page 16, line 14. In addition, dependent claims 15, 16, 20 & 33 are amended to specify that setting the noisy picture flag to "0" designates the given frame as a non-noisy or normal frame. Again, support for this amendment can be found throughout the application. No new matter is believed added to the application by the amendments presented herewith.

The present invention addresses the problem of encoding an image containing one or more areas of significantly contrasted complexity. The invention enhances picture quality by adjusting the encoding of highly complex macroblocks to use less bits. The invention recites, for example, in claim 1 a method for encoding a frame comprising multiple macroblocks. The method comprises first using intraframe statistics to determine without reference to another frame whether the given frame includes a noisy portion. If so, then the method further includes for each macroblock: determining a macroblock activity level; determining when the activity level exceeds a predefined complexity threshold, thereby indicating that the macroblock is associated with the noisy portion of the frame; and adjusting encoding when the activity level exceeds the predefined complexity threshold to conserve bits used in encoding the macroblock and thereby save bits otherwise used to encoded the noisy portion of the frame.

The Office Action cites Uz in combination with Flannaghan as allegedly rending obvious applicants' claimed invention. This conclusion and certain characterizations of

the teachings of these two patents are respectfully traversed.

Applicants submit that a valid obvious rejection requires that the prior art patents, when combined, teach or suggest all of the claim elements. In the instant application, there are numerous features of applicants' claims which are not taught or suggested by the applied patents, either individually or in combination.

Uz describes a rate control algorithm for an MPEG-2 compliant encoder. See abstract. The Uz invention relates to fade detection. Abstract. Uz detects a fade by comparing the DC luminance values of consecutive images. Col. 12, lines 28-29. This information is subsequently used to determine the sequence of I, P, and B frames to be used to encode the images. Col. 12, lines 32-35. The invention avoids the use of B frames which result in a large number of bits when used in a fade sequence. Col. 12, lines 35-36.

Initially, applicants note that Uz does <u>not</u> even address or discuss the same problem as that to which the present invention is directed. Uz addresses encoding a sequence of frames over which an image is being faded. The current invention addresses encoding an image containing a noisy portion. Applicants submit that determining when an image is being faded over a sequence of frames, and when an image contains a noisy portion are entirely unrelated and distinct problems.

Uz discloses a method for determining whether an image is being faded by comparing the DC luminance values of successive frames. Col. 12, lines 28-29. This information is used to determine the sequence of I, P, and B frames to be used in encoding the series of images. Col. 12, lines 33-35. In contrast, the current invention determines whether a frame contains a noisy portion. The noisy portion is determined by comparing macroblock activity levels within the frame. A high activity level indicates the macroblock is within a noisy portion of the image, and the encoding is adjusted to use fewer bits for the macroblock.

Therefore, Uz adjusts the encoding of a series of frames based upon a finding that the frames are fading an image, while the current invention adjusts the encoding of a single frame based upon the difference in activity levels of the macroblocks comprising the single frame. The current invention preserves more bits for the less noisy areas of the image at the expense of the highly complex image area of the frame. Uz makes no similar adjustment (nor does Flannaghan).

While both Uz and the present invention calculate values for macroblocks, the two inventions implement these calculations in distinct manners. To calculate the activity and masking activity levels, Uz uses not only the blocks comprising the current macroblock, but the eight blocks that surround the current macroblock. Col.9, lines 20-21. In contrast, the current invention uses only information within the current macroblock in obtaining values for the

macroblock. Therefore, applicants respectfully submit that these calculations are fundamentally different.

As recognized in the Office Action, Uz does not mention applicants' concept of determining whether a frame includes a noisy portion. For a teaching in this concept, the Office Action references Flannaghan (in particular, Col. 3, lines 3-10 of Flannaghan). This characterization of Flannaghan and its applicability to the amended claims presented herewith is respectfully traversed.

Flannaghan describes an apparatus for processing a televison signal including a movement detector. The detector evaluates an absolute frame difference signal on a sample by sample basis and removes unwanted noise. In the process described by Flannaghan, a frame difference which is greater than the coring threshold but surrounded by frame differences below the threshold is assumed to be noise and thus ignored. Col. 3, lines 11-14. Thus in accordance with the noise reduction scheme of Flannaghan, noise is reduced in a series of frames by essentially changing the input data, i.e., by modifying the noisy data (e.g., pixels).

There are significant differences between applicants' claimed invention and the teachings of Flannaghan. For example, applicants recite a technique for dynamically adaptly encoding of a frame having a noisy portion. Advantageously, processing in accordance with the present invention prevents noisy macroblocks or blocks with random details from consuming all or most of the picture bits,

which in turn prevents over production of bits before the encoder reaches the bottom of a given picture. The present invention essentially directs encode bits from the random, busy macroblocks to the simpler, normal macroblocks. Less bits are used in the highly active and fine detailed area, thereby providing a more constant picture quality.

Applicants note that Flannaghan (as with Uz) does not even address or discuss the same problem as that to which the present invention is directed. Flannaghan describes a noise reduction scheme which removes noise in a picture by changing the input data. A careful reading of Flannaghan fails to uncover any discussion directed to a dynamic encode approach which prevents noisy macroblocks or blocks with random details within a frame from consuming all or most of the picture bits for that frame. For this reason, applicants respectfully submit that one of ordinary skill in the art would not have combined the teachings of Flannaghan and Uz to arrive at a dynamic encode approach as recited in the independent claims presented herewith.

In the amendments presented, applicants place emphasis on using intraframe statistics to determine without reference to another frame (for example, in the sequence of frames), whether the given frame to be encoded contains a noisy portion. The advantage to using intraframe statistics only is that a whole frame does not need to be buffered for comparison of one frame to another frame. Thus, picture delay in applicants' approach is significantly less than in an approach with uses interframe statistics to determine

whether a frame is a noisy frame. A careful reading of Flannaghan fails to uncover any teaching, suggestion or implication that intraframe statistics can be employed alone, without reference to another frame, to determine whether the given frame includes a noisy portion. As noted, Flannaghan teaches a noise detection and noise removal scheme. Noise is defined in Flannaghan as a difference of signal A with a signal from a previous frame (see Col. 2, lines 42-45). For this additional reason, applicants respectfully submit that the Office Action combination of Uz and Flannaghan still fails to teach or suggest all of the claimed elements. Thus, applicants request reconsideration and withdrawal of their obvious rejection to the independent claims based upon the teachings of Uz in combination with Flannaghan.

To summarize, applicants respectfully submit that their invention as recited in the independent claims presented herewith would not have been obvious to one of ordinary skill in the art based upon the teachings of Uz and Flannaghan. Neither patent addresses or discusses the same problem as that to which the present invention is directed. Uz addresses encoding a sequence of frames over which an image is being faded. The current invention addresses encoding an image containing a noisy portion. Applicants submit that determining when an image is being faded over a sequence of frames, and when an image contains a noisy portion are entirely unrelated and distinct problems. Further, the secondary citation to Flannaghan teaches a noise detection and noise removal technique. Noise is

defined as the difference of signal A with a signal from a previous frame. Flannaghan teaches a scheme to remove noise in a picture by changing the input data. In contrast, applicants recite using intraframe statistics to determine without reference to another frame whether a current frame includes a noisy portion, and if so, applicants recite dynamically adjusting encoding of one or more macroblocks within that frame. In applicants' approach, the noisy portion of the frame is encoded as is without any alteration of the data. This is contrasted with Flannaghan which expressly teaches alteration of the data.

For all of the above reasons, applicants respectfully submit that the independent claims presented herewith patentably distinguish over Uz and Flannaghan, either individually or in combination.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

For example, in claim 7 applicants recite that the encoding (iii) comprises performing motion estimation on the macroblock and selectively adjusting macroblock coding type for the macroblock to bias the macroblock towards being coded predictive when the macroblock activity level exceeds the predefined threshold. This selectively adjusting is with reference to a predictive error value resulting from the performing of motion estimation on the macroblock. The Office Action merely states relative to claim 7 that Uz

discloses a motion estimation process done on a macroblock. However, applicants claim 7 is not directed to motion estimation per se, but rather explains how to bias the prediction error of a noisy macroblock. That is, applicants recite that the macroblock is biased predictive coded when the macroblock activity level exceeds the predefined threshold.

In claim 9, applicants recite that the adjusting encoding (iii) includes determining an adjusted quantization level for use in encoding the macroblock. This adjusted quantization level is determined to conserve bits used in encoding the macroblock when the macroblock activity level exceeds the predefined threshold. In comparison, Uz discloses a scheme to adjust the quantization step size (Col. 12, line 50-53) based on the bits used. This calculation is referred to in the present application as CAL QL. In claim 9, the CAL QL is adjusted further in order to conserve bits because the macroblock has been found to be a noisy macroblock in a noisy portion of the frame. The adjusted quantization step size is referred to in the present application as ADJ QL.

In claims 12 & 13 applicants recite that the determining whether a noisy portion exists within a frame includes calculating a frame complexity value and comparing the frame complexity value to a predefined complexity threshold. In claim 13, the frame complexity value is defined as an accumulated absolute difference value (PIX DIFF) derived from adjacent pixels of the plurality of

pixels in the frame. In comparison, the complexity measure in Uz is very different from that recite by applicants. Uz's complexity measurement is calculated after encoding the data. In contrast, applicants claims 12 & 13 is based on unencoded input picture pixels and is calculated before encoding the frame.

In claim 26, applicants recite a system for determining a macroblock activity level wherein the macroblock comprises multiple blocks. The system includes means for determining an activity level for each block of the macroblock, and means for ordering activity levels of the blocks and comparing the minimum activity level with the next to minimum activity level to derive an activity level for the macroblock.

In rejecting this claim, the Office Action acknowledges that Uz does not teach the determination of an activity level, and then states: "However, Uz fails to disclose the comparison of a minimum activity level of said order with a next minimum activity level of said order to derive said activity level for said macroblock as disclosed by the applicant. Therefore, it would have been obvious to one of ordinary skill in the art to compare the minimum activity level of said order with a next minimum activity level of said order to derive said activity level for said macroblock for encoding accuracy and efficiency." Applicants respectfully submit that a prima facie case of obviousness has not been stated against claim 26 based upon this language. It appears from a careful reading of the Office

Action that the rationale for rejecting the claim is missing from the Office Action. Therefore, applicants are unable to further comment upon the rejection beyond that previously stated in the prior response.

Specifically, Uz computes its values by using the minimum values from the blocks within the macroblock as well as those surrounding the macroblock. Col. 9, lines 12-21. Therefore, Uz always uses the minimum value calculated from blocks within and surrounding the macroblock as the value for the macroblock. In contrast, the current invention prioritizes the block values of those blocks contained within the macroblock from minimum to maximum. The invention then derives the macroblock activity level by comparing the minimum and next to minimum values. As much as Uz can be applied to the current invention, Uz teaches away from both the use of information exclusively within the macroblock, as well as the use of a value other than the minimum as an activity level for the macroblock.

Obtaining the minimum value as taught by Uz does not require the ordering of values as recited by applicants. Applicants respectfully submit that the ordering of all block values is not disclosed, taught or suggested by Uz's use of the minimum value in calculating macroblock values.

In view of the above, allowance of all claims presented herein is respectfully requested. If, however, any issue remains unresolved, the examiner is invited to telephone

applicants' undersigned representative to further discuss the application.

Respectfully submitted,

Kevin P. Radigan

Kevin P. Radigan
Attorney for Applicants
Registration No. 31,789

Dated: March 20, 2001

HESLIN & ROTHENBERG, P.C.
5 Columbia Circle
Albany, New York 12203
Telephone: (518) 452-5600
Facsimile: (518) 452-5579

Marked-Up Version of Claims

1. (Twice Amended) A method for encoding a frame having a plurality of macroblocks, said method comprising:

using intraframe statistics to determine without reference to another frame [determining] whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level;

(ii) determining when said macroblock activit level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame.

6. (Amended) [The method of claim 5,] A method for encoding a frame having a plurality of macroblocks, said method comprising:

determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level;

(ii) determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame;

wherein each macroblock of said plurality of macroblocks comprises multiple blocks, and wherein said determining (i) comprises determining an activity level for each block of said multiple blocks of said macroblock, and deriving therefrom an activity level for said macroblock;

wherein said deriving comprises ordering activity levels of said multiple blocks of said macroblock and comparing a minimum activity level of said order with a next to minimum activity level of said order to derive said activity level for said macroblock;

wherein said comparing further comprises comparing said minimum activity level of said order with an average activity level of said multiple blocks of said macroblock to derive said activity level for said macroblock; and

wherein said comparing comprises determining whether said minimum activity level is less than one-half said next to minimum activity level and whether said minimum activity level is less than one-half said average activity level of said multiple blocks, and when both are so, defining said activity level of said macroblock as said next to minimum activity level of said order, otherwise defining said activity level of said macroblock as said minimum activity level of said order.

8. (Amended) [The method of claim 7,] A method for encoding a frame having a plurality of macroblocks, said method comprising:

using intraframe statistics to determine without reference to another frame [determining] whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level;

(ii) determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame. determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame;

determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level;

(ii) determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame;

wherein said adjusting encoding (iii) comprises performing motion estimation on said macroblock and selectively adjusting macroblock coding type for said macroblock to bias said macroblock towards being coded predictive when said macroblock activity level exceeds said predefined threshold, said selectively adjusting being with reference to a predictive error value resulting from said performing motion estimation on said macroblock; and

wherein said selectively adjusting comprises determining when said predictive error is greater than a second predefined threshold and said predictive error is greater than one-half said macroblock activity level, and when both are so, adjusting a macroblock coding type parameter to bias said macroblock towards being coded predictive.

10. (Amended) [The method of claim 9,] A method for encoding a frame having a plurality of macroblocks, said method comprising:

determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level;

(ii) determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame;

wherein said adjusting encoding (iii) comprises determining an adjusted quantization level for use in encoding said macroblock, said adjusted quantization level being determined to conserve bits used in encoding said macroblock when said macroblock activity level exceeds said predefined threshold; and

wherein said determining of said adjusted quantization level comprises calculating a quantization level (CAL QL) for said macroblock and defining said adjusted quantization level (ADJ QL) as:

ADJ QL=MIN((1 + 0.25 (TH2 - BR + 1))·CAL QL; MAX ALLOWED BY STANDARD)

Where: BR is the target bitrate;

TH2 is a second predefined value; and
MAX QL ALLOWED BY STANDARD is a maximum quantization level allowed by MPEG standard.

14. (Amended) [The method of claim 13,] A method for encoding a frame having a plurality of macroblocks, said method comprising:

determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) determining a macroblock activity level;

(ii) determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame;

wherein said determining whether said frame comprises said noisy portion includes calculating a frame complexity

value and comparing said frame complexity value to a predefined complexity threshold;

wherein said frame comprises a plurality of pixels, and wherein each pixel of said frame comprises a multi-bit value, and wherein said frame complexity value comprises an accumulated absolute difference value (PIX-DIFF) derived from adjacent pixels of said plurality of pixels of said frame; and

wherein said PIX-DIFF is defined as:

$$\sum_{y=1,3,5\ldots}^{Max} |L_y - L_{y+1}|$$

Where: L represents luminance value of a pixel, and y represents pixel position within the frame.

15. (Amended) The method of claim 13, further comprising setting a noisy picture flag to "0" when said frame complexity value is less than said predefined complexity threshold, wherein said flag set to "0" designates said frame as a non-noisy or normal frame.

16. (Amended) The method of claim 13, wherein said determining whether said frame comprises said noisy portion further includes comparing a target bitrate for said frame to a predefined bitrate threshold and when said target bitrate for said frame exceeds said predefined bitrate threshold, said method further comprises setting a noisy

picture flag equal to "0", wherein said flag set to "0" designates said frame as a non-noisy or normal frame, and if said target bitrate is less than said predefined bitrate threshold, then setting said noisy picture flag to "1", wherein said "1" noisy picture flag setting indicates said frame includes said noisy portion.

17. (Amended) A method for encoding a frame of a sequence of frames, each frame having a plurality of macroblocks, said method comprising:

using intraframe statistics to determine without reference to another frame [determining] whether said frame includes a random noise portion; and

when said frame includes said random noise portion, evaluating each macroblock of said plurality of macroblocks in said frame and adjusting encoding of at least some macroblocks thereof within said random noise portion of said frame, said adjusting comprising reducing bits used in encoding said at least some macroblocks within said random noise portion.

19. (Amended) [The method of claim 18,] A method for encoding a frame of a sequence of frames, each frame having a plurality of macroblocks, said method comprising:

determining whether said frame includes a random noise portion; and

when said frame includes said random noise portion, evaluating each macroblock of said plurality of macroblocks in said frame and adjusting encoding of at least some macroblocks thereof within said random noise portion of said frame, said adjusting comprising reducing bits used in encoding said at least some macroblocks within said random noise portion;

wherein each frame of the sequence of frames comprises a plurality of pixels, each pixel of each frame comprising a multi-bit value, and wherein said determining whether said claim includes said random noise portion includes calculating a frame complexity value and comparing said frame complexity value to a predefined complexity threshold, said calculating of said frame complexity value including deriving an accumulated absolute difference (PIX-DIFF) from adjacent pixels of said plurality of pixels of said frame; and

wherein said deriving of said PIX-DIFF comprises forming a string of pixels by concatenating said plurality of pixels of said frame and defining PIX-DIFF as:

$$\sum_{y=1,3,5\ldots}^{Max} |L_y - L_{y+1}|$$

Where: L represents luminance value of a pixel, and y represents pixel position within the string of pixels.

20. (Amended) The method of claim 18, wherein when said frame complexity value is less than said predefined complexity threshold, said method further comprises setting a noisy picture flag to "0" and performing normal encoding on said frame, wherein said flag set to "0" designates said frame as a non-noisy or normal frame, and wherein when said frame complexity value is greater than said predefined complexity threshold, said method further comprises determining whether a target bitrate of said frame is less than a predefined bitrate threshold, wherein when said target bitrate of said frame exceeds said predefined bitrate threshold, said method comprises setting said noisy picture flag to "0", and when said target bitrate of said frame is less than said predefined bitrate threshold, said method comprises setting said noisy picture flag to "1", wherein said "1" noisy picture flag setting indicates that said frame includes said random noise portion.

24. (Twice Amended) A system for encoding a frame comprising a plurality of macroblocks, said system comprising:

means for using intraframe statistics to determine without reference to another frame [determining] whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) means for determining a macroblock activity level;

(ii) means for determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) means for adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame.

27. (Amended) [The system of claim 26,] A system for encoding a frame comprising a plurality of macroblocks, said system comprising:

means for determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) means for determining a macroblock activity level;

(ii) means for determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) means for adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame;

wherein each macroblock of said plurality of macroblocks comprising multiple blocks, and wherein said means for determining (i) comprises means for determining an activity level for each block of said multiple blocks of said macroblock, and means for ordering activity levels of said multiple blocks of said macroblock and comparing a minimum activity level of said order with a next to minimum activity level of said order to derive an activity level for said macroblock; and

wherein said means for comparing comprises means for determining whether said minimum activity level is less than one-half said next to minimum activity level and whether said minimum activity level is less than one-half an average activity level of said multiple blocks, and when both are true, for defining said activity level of said macroblock as said next to minimum activity level in said macroblock, otherwise for defining said activity level of said macroblock as said minimum activity level of said order.

29. (Amended), A system for encoding a frame comprising a plurality of macroblocks, said system comprising:

means for determining whether said frame includes a noisy portion, and if so, then for each macroblock of said frame:

(i) means for determining a macroblock activity level;

(ii) means for determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

(iii) means for adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame;

wherein said means for adjusting encoding (iii) comprises means for performing motion estimation on said macroblock and for selectively adjusting macroblock coding type for said macroblock to bias said macroblock towards being coded predictive when said macroblock activity level exceeds said predefined threshold, said selectively adjusting being with reference to a predictive error value resulting from said performing of motion estimation on said macroblock; and

wherein said means for selectively adjusting comprises means for determining when said predictive error is greater than a second predefined threshold and when said predictive error is greater than one-half said macroblock activity level, and when both are so, said means for selectively adjusting comprises means for adjusting a macroblock coding type parameter to bias said macroblock towards being coded predictive.

31. (Amended) A system for encoding a frame of a sequence of frames, each frame having a plurality of macroblocks, said system comprising:

a pre-encode processing unit for using intraframe statistics to determine without reference to another frame [determining] whether said frame includes a random noise portion; and

a control and encode unit for evaluating each macroblock of said plurality of macroblocks in said frame when said frame includes said random noise portion, said control and encode unit including means for adjusting encoding of at least some macroblocks within said random noise portion of said frame to reduce bits used in encoding said at least some macroblocks within said random noise portion.

33. (Amended) The system of claim 32, wherein when said frame complexity value is less than said predefined complexity threshold, said pre-encode processing unit further comprises means for setting a noisy picture flag to "0" and performing normal encoding on said frame, wherein said flag set to "0" designates said frame as a non-noisy or normal frame, and when said frame complexity value is greater than said predefined complexity threshold, said pre-encode processing unit comprises means for determining whether a target bitrate of said frame is less than a predefined bitrate threshold, and when said target bitrate of said frame exceeds said predefined bitrate threshold,

said pre-encode processing unit comprises means for setting said noisy picture flag to "0", and when said target bitrate of said frame is less than said predefined bitrate threshold, said pre-encode processing unit comprises means for setting said noisy picture flag to "1", wherein said "1" noisy picture flag setting indicates that said frame includes said random noise portion.

37. (Twice Amended) A computer program product comprising a computer usable medium having computer readable program code means therein for use in encoding a frame comprising a plurality of macroblocks, said computer readable program code means in said computer program product comprising:

computer readable program code means for causing a computer to affect <u>using intraframe statistics to determine without reference to another frame</u> [determining] whether said frame includes a noisy portion, and if so, then for each macroblock of said frame said computer program comprises:

computer readable program code means for causing a computer to affect determining a macroblock activity level;

computer readable program code means for causing a computer to affect determining when said macroblock activity level exceeds a predefined threshold, wherein said macroblock activity level

exceeding said predefined threshold indicates that said macroblock is associated with said noisy portion of said frame; and

computer readable program code means for causing a computer to affect adjusting encoding of said macroblock when said macroblock activity level exceeds said predefined threshold to conserve bits used in encoding said macroblock and thereby save bits otherwise used to encode said noisy portion of said frame.

38. (Amended) A computer program product comprising computer usable medium having computer readable program code means therein for use in encoding a frame of a sequence of frames, each frame having a plurality of macroblocks, said computer readable program code means in said computer program product comprising:

computer readable program code means for causing a computer to affect <u>using intraframe statistics to determine without reference to another frame</u> [determining] whether said frame includes a random noise portion; and

computer readable program code means for causing a computer to affect evaluating each macroblock of said plurality of macroblocks in said frame and when said frame includes said random noise portion, adjusting encoding of at least some macroblocks within said

random noise portion of said frame, said adjusting comprising reducing bits used in encoding said at least some macroblocks within said random noise portion.

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